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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 3, 2018/2019

### TCP2201 OBJECT ORIENTED ANALYSIS AND DESIGN

(All sections/groups)

28 MAY 2019

9:00 A.M. – 11:00 A.M.

(2 Hours)

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#### INSTRUCTIONS TO STUDENTS

1. This question paper consists of 13 pages with 4 questions only.
2. Answer **ALL QUESTIONS**.
3. All questions carry equal marks (25 marks) and the distribution of the marks for each sub-question is given.
4. Write your answers in this paper.

**Question 1**

The code below has many problems:

- It violates Java naming conventions.
- It violates encapsulation.
- It contains an example of bad practice which should have been solved with polymorphism.

Rewrite this code so that it fixes these problems. If you create more than one class to fix this, you must clearly indicate the files that those classes should be in. You do not have to write the CbdModel class – you can assume that it is already provided.

Make the changes in the code below – cross out what you want to remove and write in what you want to change it to. [25 marks]

import javax.swing.*;
import java.awt.event.*;
public class CbdGUI extends JFrame implements ActionListener
{   public CbdModel model;
public CbdGUI()
{   super("CBD System");
JPanel p = new JPanel();
add(p);
setSize(250,80);
JButton CButton = new JButton("Cronfi");
JButton BButton = new JButton("Brown");
JButton DButton = new JButton("Doriq");
p.add(CButton);
p.add(BButton);
p.add(DButton);
CButton.addActionListener(this);
BButton.addActionListener(this);
DButton.addActionListener(this);

**Continued...**

model = new CbdModel(this);
setVisible(true);
setDefaultCloseOperation(EXIT_ON_CLOSE);
}
public void actionPerformed(ActionEvent e)
{ String item = ((JButton)e.getSource()).getText();
switch(item)
{ case "Cronfi":
model.cronfi();
break;
case "Brownno":
model.brownno();
break;
case "Doriq":
model.doriq();
break;
}
}
}

Continued...

[illegible]

**Question 2**

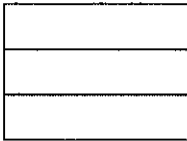

- a) Describe any three (3) advantages of using UML diagrams in software design.

[6 marks]


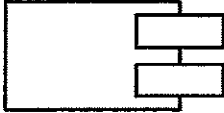
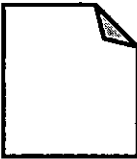

1	
2	
3	

- b) Complete the following UML notation symbol table by writing down the purpose of the listed symbols AND give one (1) example of a diagram that uses that particular symbol. One example has been completed for your reference.

[5 marks]

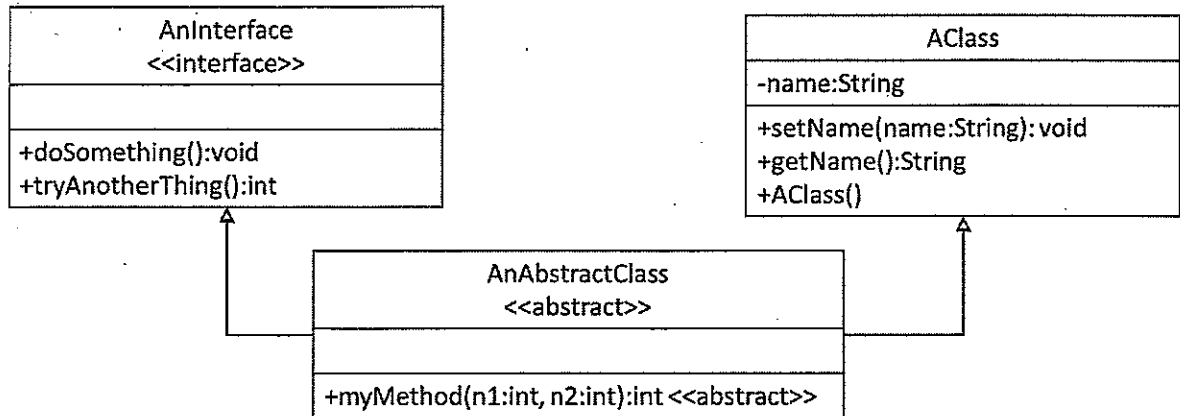
UML SYMBOL	NAME AND PURPOSE	USED IN UML DIAGRAM
	Class symbol used to represent sets of objects with the same properties	Class diagram
		

Continued...

UML SYMBOL	NAME AND PURPOSE	USED IN UML DIAGRAM
		
		
		
		

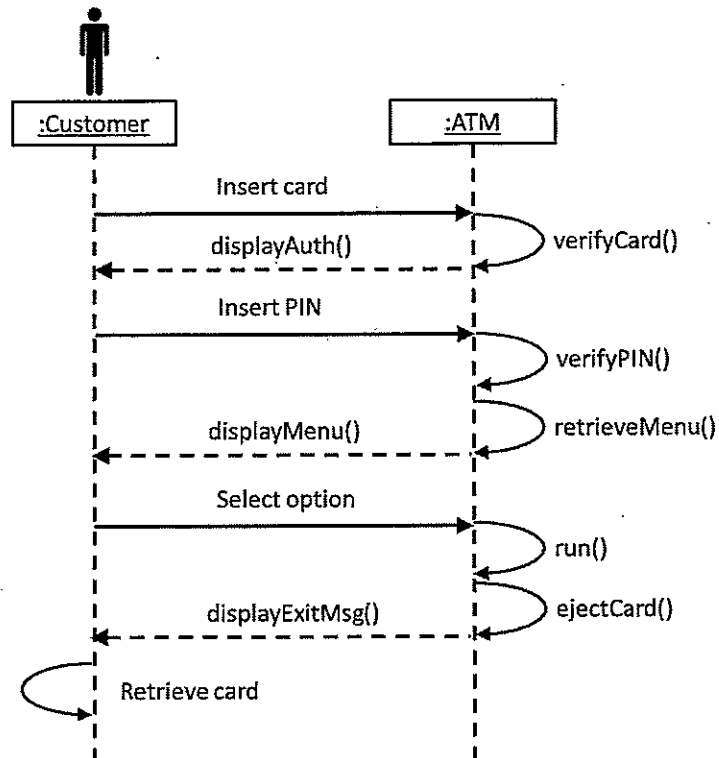
Continued...

- c) Convert the following UML class diagram into its equivalent Java code. Note that you should complete all the function bodies and the constructors where available. [8 marks]

[illegible]

**Continued...**

- d) Convert the following sequence diagram into its collaboration diagram equivalent. [6 marks]



Continued...



**Question 3**

- a) Briefly describe the work involved in the following types of software projects [5 marks]

Project Type	Worked involved
Greenfield projects	
Corrective projects	
Adaptive projects	
Enhancement projects	
Perfective projects	

- b) The following table lists several design requirement statements in the first column. Complete the table by filling in the columns with the [1] type of requirement and [2] brief description of that requirement

[8 marks]

Example	Requirement Type	Description
<i>The system must respond to use inputs in less than 5 seconds</i>		
<i>The application must run on ARM based processors</i>		
<i>Delivery of the system should be within 90 days of signed contract</i>		
<i>Generated audio file should be in 16-bit ADPCM format</i>		

Continued...

- c) There are 11 principles in system design that should be applied to ensure better project outcomes. Explain briefly (single statements are preferred) of any four (4) of the principles and how it affects design.

[8 marks]


**Continued...**

- d) The following code excerpt for a parent class is said to not fully support the interface segregation principle (ISP) of object-oriented design. Explain [1] what ISP is, [2] where in the code this violation occurs and its implications on programming and finally [3] what corrections can be made to avoid the problems that will occur

```
class Animal{  
    void setName(String name);  
    void setGender(char sex);  
    void setAltitude(double height);  
    void layEgg(int eNum);  
}
```

[4 marks]

**Continued...**

**Question 4**

- a) Please state what category these design patterns are in, and explain what each one means. [9 marks]

Pattern	Category	Explanation
Proxy		
Interpreter		
Visitor		

- b) You are working on the Troxi module of the Poram project. Other parts of the Poram project, which will be written by other people, will occasionally need to know when the Troxi module has some significant status change. You do not know what those other modules written by other people are, but you will need to be able to let those modules know as necessary.

What design pattern would you use for this scenario? Explain why you would choose this design pattern – what the various parts correspond to in the pattern, and why this pattern would solve the problem. You are not required to provide a class diagram, but you may use one in your explanation if you want to. [6 marks]

Warning: No marks will be given if you do not explain why you chose this design pattern. If there is more than one possible design pattern, you must only choose one, and your explanation will partially determine if your choice is reasonable or not. If you name more than one, only the first one will be marked.

Design Pattern:

Explanation:

Continued...

- c) You are writing a hand phone app that will access a cloud-based image database to search for pictures using keywords and display them for selection and downloading. There are thousands of photos in the image database, and so the images cannot be stored on the hand phone, but you want to be able to search quickly on the hand phone by keyword even when the data connection is slow, so you want the search to occur locally.

What design pattern would you use for this scenario? Explain why you would choose this design pattern – what the various parts correspond to in the pattern, and why this pattern would solve the problem. You are not required to provide a class diagram, but you may use one in your explanation if you want to. [6 marks]

Warning: No marks will be given if you do not explain why you chose this design pattern. If there is more than one possible design pattern, you must only choose one, and your explanation will partially determine if your choice is reasonable or not. If you name more than one, only the first one will be marked.

Design Pattern:

Explanation:

- d) When is Iterator useful? Why is it useful? [4 marks]

When:

Why:

**End of paper**